

Evidence for Reversal of Magnetic Field Polarity in Coronal Streamers

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Radio occultation measurements conducted with both natural
radio sources and spacecraft radio signals have probed the solar
corona for many years. Based on a wide variety of propagation
and scattering phenomena, these measurements have yielded
considerable information on electron density and its fluctuation, as
well as solar wind velocity. Faraday rotation of a linearly
polarized radio wave is unique amongst radio occultation
measurements because it responds to the solar magnetic field, thus
making it possible to probe the coronal magnetic field and its
fluctuation.

Coronal transients were detected when Faraday rotation
measurements of the solar corona were first carried out in 1968
using the Pioneer 6 radio signal. The purpose of this paper is to
show that, while some Faraday rotation transients are associated
with coronal mass ejections, those observed by Pioneer 6 were
coronal streamers. Identifying these transients as coronal
streamers makes available new measurements of coronal
streamers. Specifically, the detection of the reversal of magnetic
field polarity high in the corona provides the first observational
evidence for what has previously been inferred from modeling –
that streamers observed in white-light measurements are the
manifestation of the heliospheric current sheet.

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